domat
MEMBER OF CEZ ESCO

merbon
IDE

order number

wMX   DDC controller

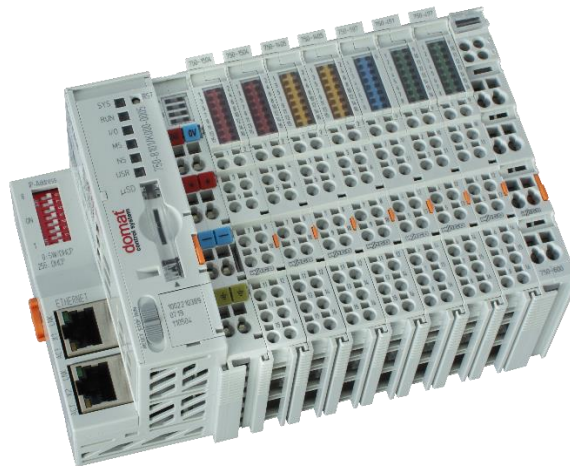|	
Summary	**DDC (Direct digital control) controller wMX is a compact PLC with Merbon RT. The controller contains two Ethernet ports and a datapoint mix of 16 AI, 32 DI, 8 AO a 32 DO. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O modules within the 750/753 series.**
Application	• **Freely programmable control units for HVAC systems and other applications with web access.** • **Data acquisition, processing, and presentation systems with advanced networking features.** • **Protocol converters with web data presentation (must be programmed by user).**

Function   Controller wMX has twin-port Ethernet interface and thanks to integrated switch it is able to create bus topology.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Merbon IDE
- Direct connection of I/O modules
- 2 × Ethernet (configurable)
- Operating system Linux
- Maintenance free / Low maintenance

The application is created and uploaded in the Merbon IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

IO modules (16 AI, 8 AO, 32 DI, 32 DO) communicate with the main unit over an internal K-bus.

The process station contains a web server for remote connection and user intervention. The web pages are created in Merbon HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Merbon IDE.

State of inputs and outputs of each module, system status, runtime operation and power supply condition is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

See *domat – Technical application notes* for connection examples.

Technical data	
Power	24 V DC (−25...+30 %), 5.3 W, cage clamp type terminals
Operating temperature	0...55 °C
Max. admissible humidity	95 %
PLC:	
Type	750-8101
CPU	Cortex A8, 600 MHz
Memory	256 MB RAM, 6 kB NVRAM
Memory card	microSD up to 32 GB
	(push/push type slot, cover possible to seal)
Addressing	SW or by DIP switches
Communication:	
Ethernet	2 × Ethernet 10/100, RJ45
	2 × signalling LEDs (Link, Data) part of the Ethernet connector
Programming enviroment	Merbon IDE ver. 2:4:0:x or later (ST, FBD)
Terminals	cage clamp terminals - wire 0.08...2.5 mm²
Analogue inputs	**8 ×** Pt 1000, resistence 0...1200 Ohm, 0...5000 Ohm, 16 bit resolution
	(other measuring ranges, like Pt100, Ni1000 etc. can be recalculated using predefined transformations in the Merbon program)
	8 × voltage 0...10 V DC / ±10 V DC, 12 bit resolution
Analogue outputs	**8 ×** 0...10 / ±10 V DC
Load impedance	>= 2 kΩ
Digital inputs	**32 ×** 24 V DC – need to connect DC voltage, e.g. that from the power supply
Input voltage „log. 0"	max. 5 V DC, 1.6 mA

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Input voltage „log. 1"	max 30 V DC, 4.3…4.6 mA
Digital outputs	**32 ×** semiconductor, NO: 0.5 A / 24 V DC, 1 kHz
Dimensions	71.9 (h) × 158 (w) × 100 (h) mm
Weight	approx. 525 g
Protection degree	IP20
Material	polycarbonate, polyamide 6.6
Standards confirmity	electromagnetic compatibility (EMC)EN 61000-6-2, 61000-6-3
	environmental testing EN 60068-2-42, 60068-2-43

Dimensions and connection
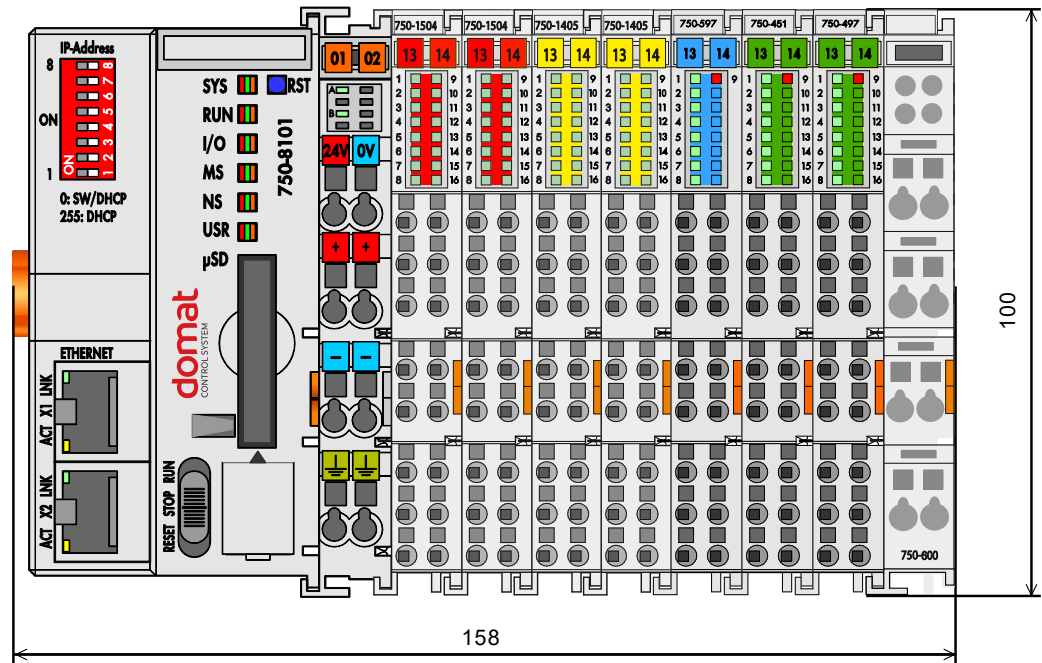
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **–** terminals on the power module (see image below).
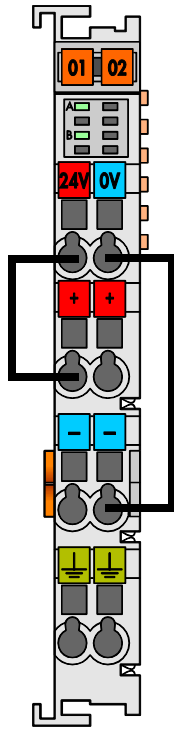
During the installation, ensure sufficient distance of controller assembly from other components:
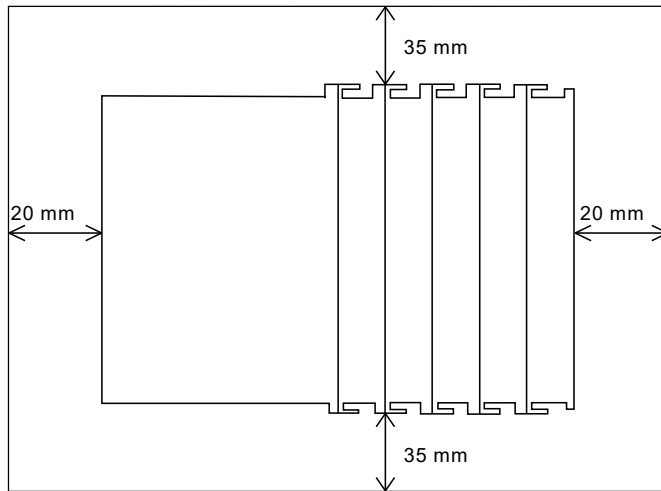
Controller is made from PLC: PFC100 (750-8101) and modules: 750-1504, 750-1405, 750-597, 750-451, 750-497 , 750-600.

Analogue inputs

Analogue input module **750-451** has fixed resistence measurement at 8 inputs.
Analogue input module **750-497** has fixed input voltage measurement (8 inputs, range 0...10 V).
See connection schemes (two-wire connection):
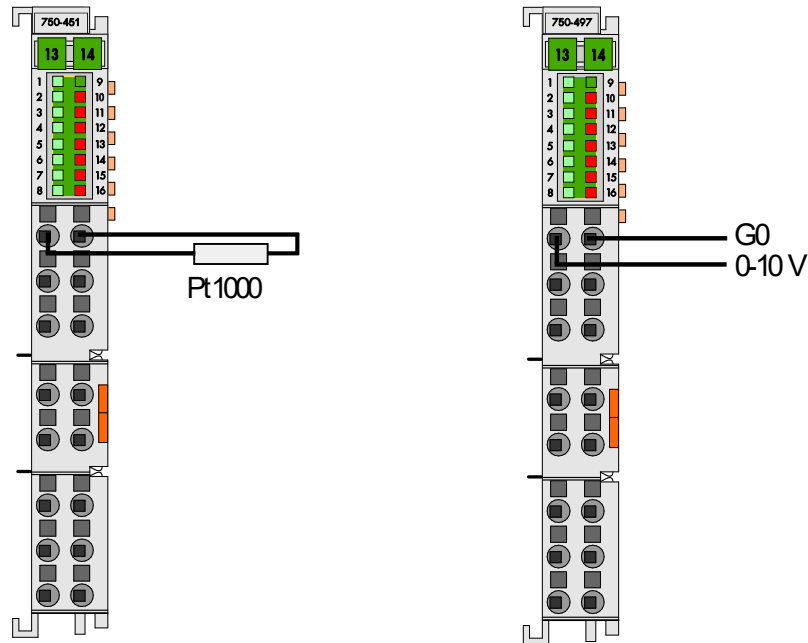
Operational readiness and trouble-free data bus communication of each input is **indicated** by green LED. For the 750-497 module, red LED indicates when measuring range is exceeded or falls below its limit for a given input. For the 750-451 module, red LED indicates wire break, short circuit or when signal is out of measuring range.

For accuracy of mesurement see table in complete specification datasheet.
Complete specification of module is stated in particular datasheet:
w750-451   w750-497

Analogue outputs

Analog output module **750-597** (8 AO) provide 0...10 V DC (or ±10 V). Output signal is galvanicaly insulated and will be transmitted with a resolution of 12 bits. Measurement error is 0.1 % from the measuring range. All outputs have common ground M (terminals 9...16), which is connected to the module minus terminal by common contact.
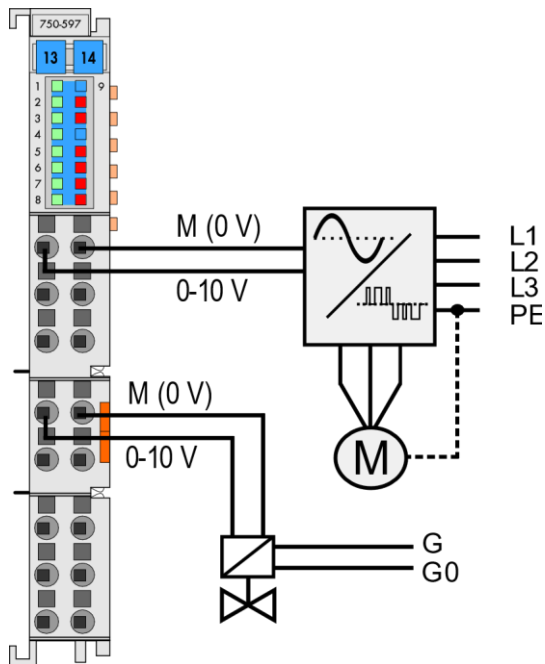
Operational readiness and trouble-free data bus communication of each channel is **indicated** by green LED. Red LED indicates status of the field power supply voltage (undervoltage or general error).

Complete specification of module is stated in particular datasheet:
w750-597

Digital inputs   Digital inputs module **750-1405** has 16 input channels (24 V DC, 3 ms). Inputs can be powered by the same power supply as wMX controller. Voltage levels are:
-3 V…+5 V for logical zero and +11 V…+30 V for logical one.

Digital inputs are connected according this schema (two-wire connection):
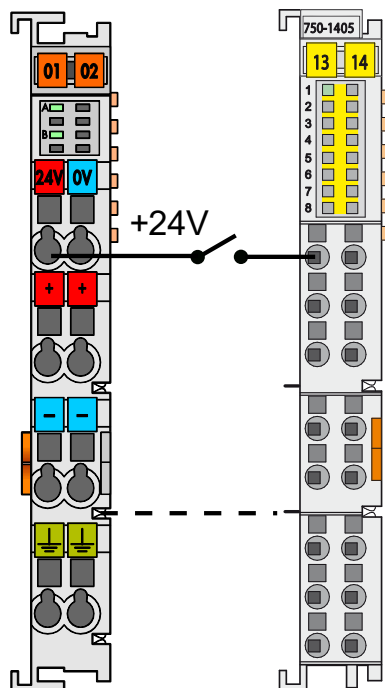
Dashed line is via PLC internal bus.
Switched state of each input is **indicated** by green LED (lit = logical one detected).

Complete specification of module is stated in particular datasheet:
w750-1405

Digital outputs   Digital outputs module **750-1504** has 16 output channels (24 V DC, 0.5 A, short-circuit protected, 1 kHz).
See scheme below for connection:
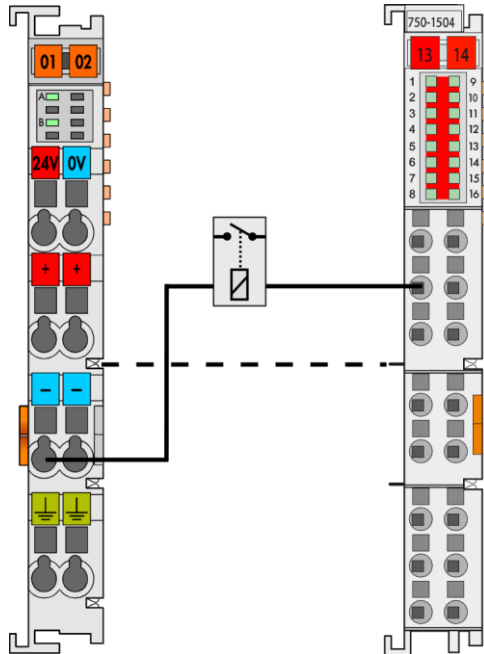
The dashed line is connected via the PLC internal bus.
Switched status of each output is indicated by the green LED in upper part of the module.
Complete specification of module is stated in particular datasheet:
w750-1504

LED indication
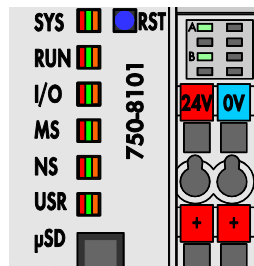
Red/ green/ orange LED (blink):
SYS – system status
RUN – runtime is running
I/O – bus status (not used)
MS – module status (not used)
NS – not used
USR – user programmable
green LED:
uSD – SD card status (blinks during writing on card)
A – state of supply voltage (still)
B – state of I/O modules supply voltage (still)

Switches   **RST**   Reset button - unused

RESET STOP RUN

Turning this switch in RUN position, will start runtime. Turning the switch in STOP position will stop runtime. In this position is not possible to deploy and run solution.
Holding switch in RESET position for 2-7 seconds will cause warm restart. Holding for time longer than 7 seconds will cause cold restart.

Address	By DIP switches the IP address can be set:

0 – default address / SW address
1...254 – fixed address (192.168.1.1...254)
255 – DHCP

Others **Internal Kbus addressing**

For each module a position corresponding to the physical position in assembly is given to the module. E.g. first module after controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.
To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **–** terminals on the power module (see image in *Dimensions and connection*).

You can find complete specification of each device at www.wago.com.

Programming The main programming tool is the Merbon package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Merbon IDE). The Merbon package contains also LCD menu editor as well as web editor (Merbon HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.
Number of connections from SSCP clients is max. 20. This includes connections from Merbon IDE, Merbon SCADA, HT104/200, mobile application Merbon Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Merbon IDE reserves two SSCP TCP connections.

Accessories **Mini-WSB marking card (247-513)**

- snap-on type
- horizontal markings of each module
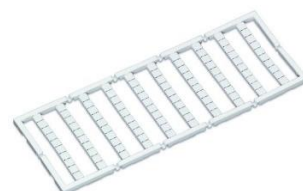
Safety note The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

Changes in versions	01/2020 – First datasheet version.
	12/2021 – Module datasheets links update, stylistic adjustments.
	02/2022 – Logo change, stylistic modifications, added information about limiting the number of connected clients.
	03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.
	05/2022 – Memory size update.
	08/2022 – Stylistic modifications (list of modules, order number).